UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE BOARD OF PATENT APPEALS
AND INTERFERENCES

Ex parte ROBERT P. MEAGLEY,
TAKASHI HIRANO, and
MICHAEL D. GOODNER

Appeal 2007-0104
Application 10/616,895
Technology Center 1700

Decided: March 30, 2007

Before EDWARD C. KIMLIN, CATHERINE Q. TIMM, and JEFFREY T. SMITH, *Administrative Patent Judges.*

SMITH, *Administrative Patent Judge.*

DECISION ON APPEAL

Statement of the Case

This is an appeal under 35 U.S.C. § 134 from a final rejection of claims 1, 4-9, 12-15, 18, 19, 22-25, and 28-30. We have jurisdiction under 35 U.S.C. § 6.

We AFFIRM.

Appellants invented a method of blending a photodefinable polybenzoxazole precursor with zirconia particles. Photodefinable materials are useful in semiconductor fabrication (Specification 1). Independent claim 1 is reproduced below:

1. A method comprising:

blending a photodefinable polybenzoxazole precursor with zirconia particles having a particle size of less than 100 nanometers.

The prior art set forth below is relied upon by the Examiner as evidence of obviousness:

Hattori	US 5,116,885	May 26, 1992
Sezi	US 2002/0132061 A1	Sep. 19, 2002

Claims 1, 4-15, 18, 19, 22-25, and 28-30 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Sezi in view of Hattori.

According to the Examiner:

> Sezi (see particularly paragraphs 17, 25, 27, 32-35, 37; example 5) discloses compositions comprising polymers, preferably including polybenzoxazoles and their polyhydroxyamide precursors, and fillers having particle sizes less than 1000nm, preferably less than 100nm and more preferably 0.5-20nm. Examples of disclosed fillers include silica, titanium, aluminium and oxides of various metals but zirconia (zirconium oxide) is not disclosed. Example 5 coats polyhydroxyamide and 3g of fine silica onto a silicon disk and applies heat to convert the poyhydroxyamide into polybenzoxazole. While Sezi does not disclose zirconia filler, zirconia is a known filler that may be used instead of silica and

> various other metal fillers and their oxides disclosed in Sezi as shown by Hattori et al. (see particularly col. 2, line 63- col. 3, line 3). Hattori et al. discloses that inorganic fillers for polymer compositions may include silica, zirconia, titania, alumina, etc. It would be obvious to one skilled to substitute the known inorganic filler zirconia shown to useful in Hattori as a filler along with fillers as disclosed Sezi as the filler, particularly metal oxide filler, called for in Sezi with a reasonable expectation of similar results.

(Answer 4).

Appellants argue that the inorganic constituents of Sezi serve a special-purpose in that they are removed to form pores in the porous layer and that there is nothing in the cited portion of the Hattori reference "to lead one to believe that zirconia can be easily substituted 'with a reasonable expectation of similar results.' That is, there is nothing in Hattori that suggests that zirconia is an art recognized equivalent, which can be removed from Sezi's polymer to form a porous layer." (Reply Br. 2-3).

Appellants further argue that in view of the declaration there is no reason to believe that the claimed subject matter would have been obvious because the use of zirconia as a filler material unexpectedly exhibited reduced thixotropy in photodefinable polymers (Br. 11).

Issue

Would one with ordinary skill in this art have reasonably expected success in combining the teachings of Sezi and Hattori in the manner proposed by the Examiner?

Findings of Fact

Appellants invented a photodefinable buffer coating that comprises polybenzoxazole (Specification 2).

The Specification discloses that "[t]he use of silica or zirconia particles may be advantageous in some embodiments because they can contribute good chemical resistance to solvent-based strippers, increased transparency, and low coefficient of thermal expansion to the final formulation" (Specification, paragraph bridging pages 2 and 3). The Specification does not discuss thixotropy or varying viscosity with sheer rate.

Sezi describes processes for producing coated substrates that occur in chip technology and electronic components ([0001]). Sezi further describes the coatings for the substrates can comprise polybenzoxazoles and inorganic constituents ([0025] and [0030]). Sezi discloses that silica is a preferred inorganic constituent. However, zirconia is not included in the list of preferred inorganic constituents.

Sezi discloses in order to create a porous layer on a substrate, the inorganic constituent should be removed to a substantial extent from the layer formed on the substrate ([0020]). Sezi discloses the solution chosen to remove the inorganic constituents must be selected so as to not dissolve or have a swelling action on the organic polymer constituent or attack the polymer in another way but at the same time has to remove the inorganic constituent to a substantial extent from the layer ([0021]).

Hattori describes resin compositions comprising various fillers suitable for use in semiconductors in other electronic parts (col. 1, ll. 11-17).

Suitable inorganic fillers include zirconia as well as silica (col. 2, ll. 63-65). Hattori discloses "[t]he inorganic filler is incorporated for the purpose of reducing the thermal expansion coefficient of the resin" (col. 3, ll. 12-13).

Principles of Law

Obviousness under 35 U.S.C. § 103 does not require absolute predictability of success. *In re O'Farrell*, 853 F.2d 894, 903-04, 7 USPQ2d 1673, 1681 (Fed. Cir. 1988). For obviousness under § 103, all that is required is a reasonable expectation of success. *Id.*

"Once a prima facie case of obviousness has been established, the burden shifts to the applicant to come forward with evidence of nonobviousness to overcome the prima facie case." *In re Huang*, 100 F.3d 135, 139, 40 USPQ2d 1685, 1689 (Fed. Cir. 1996).

The question as to whether unexpected advantages have been demonstrated for the claimed subject matter is a factual question. *See In re Johnson*, 747 F.2d 1456, 1460, 223 USPQ 1260, 1263 (Fed. Cir. 1984).

The Appellant must supply a factual basis to rebut the prima facie case of obviousness established by the Examiner. *See, e.g., In re Klosak*, 455 F.2d 1077, 1080, 173 USPQ 14, 16 (CCPA 1972).

Analysis

Appellants for the first time in the Reply Brief argue that the inorganic constituents of Sezi serve a special purpose in that they are removed to form pores in the porous layer and that there is nothing in the Hattori reference that suggests zirconia is a recognized equivalent for silica that could be easily removed to form a porous layer without swelling the polymer or

attacking the polymer if exposed to a solution or that is removable by plasma (Reply Br. 2-3). Appellants' argument is not persuasive. Sezi discloses the solution chosen to remove the inorganic constituents must be selected so as to not dissolve or have a swelling action on the organic polymer constituent or attack the polymer in another way but at the same time has to remove the inorganic constituent to a substantial extent from the layer ([0021]). As such, a person of ordinary skill in the art would choose the appropriate solution for removing the particular type of inorganic constituent (i.e. zirconia) from the layer to create a porous layer.

Appellants argue that the Examiner's alleged basis for modification of the Sezi reference has not been shown to come from the prior art (Reply Br. 2). Appellants' argument is not persuasive. Both the Sezi and Hattori references describe polymer compositions that are suitable for use in electronic devices including semiconductors. Both references describe inorganic particles that have similar particle sizes. (*See* Sezi [0034] and Hattori col. 3, ll. 21-24). As such, a person of ordinary skill in the art would have reasonably expected that inorganic particles known to be used in electronic parts could be substituted for one another. For obviousness under § 103, all that is required is a reasonable expectation of success. Obviousness does not require absolute predictability of success.

Appellants argue that "[i]n view of the declaration[1] [submitted] by one of the applicants, there is no reason to believe that the claims so rejected would have been obvious to one of ordinary skill in the art" (Br. 11).

[1] The Declaration, signed October 25, 2005, attached to Appellants' Brief.

Appellants contend that the Declaration establishes that the use of zirconia as a filler material greatly reduces thixotropy in the photodefinable polymers that the inventors were developing (Br. 11).

The question as to whether unexpected advantages have been demonstrated for the claimed subject matter is a factual question. *See In re Johnson*, 747 F.2d 1456, 1460, 223 USPQ 1260, 1263 (Fed. Cir. 1984). Thus, it is incumbent upon the appellant to supply the factual basis to rebut the prima facie case of obviousness established by the Examiner. *See, e.g., In re Klosak*, 455 F.2d 1077, 1080, 173 USPQ 14, 16 (CCPA 1972). In this regard, Appellants' position that the Declaration establishes unexpectedly improved results is not persuasively explained or substantiated on this record by the conclusory statements presented in the Declaration. Appellants have not provided the data utilized in formulating the declarant's position. Furthermore, the declarant has not provided an explanation of factual evidence that was utilized in formulating the conclusion of unexpected results.

We are convinced by these circumstances that a reasonable expectation of success exists for the Examiner's proposed combination of the Sezi and Hattori teachings. Therefore, the record before us, on balance, establishes an unpersuasively-rebutted prima facie case of obviousness with respect to the Examiner's rejection.

Conclusion of Law

Based on the record of this appeal, one with ordinary skill in this art would have had a reasonable expectation that zirconia could be used in place

of silica as an inorganic filler in the polymer composition of Sezi in the manner proposed by the Examiner.

Decision

The decision of the Examiner rejecting claims 1 4-9, 12-15, 18, 19, 22-25, and 28-30 is affirmed.

No time period for taking any subsequent action in connection with this appeal may be extended under 37 C.F.R. § 1.136(a)(1)(iv) (2006).

AFFIRMED

tf/ls

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